The Capitol Hill Monitor

Volume 21 Issue 2 (2018) May 2018

CHM "SOUTH" – Meet-UP this coming Wednesday

By Kenneth Fowler (KD4IIW@yahoo.com)

Do you live in the southern portion of the DC Metro Region? I am looking to start a subgroup of CHM'ers in the Fredericksburg area. Please join us for the first meet-up on Wednesday, May 9th, 2018. I hope to make this a regular event. This meet-up will be an informal get-together. At this point there is no agenda. Open to anyone interested in operating or listening to anything radio: Amateur Radio, SWL, or Scanners, etc. Join us for dinner or just coffee. Bring your radios or devices for a show and tell.

When: Wednesday, May 9, 2018 at 19:00

Where: Four Seasons Family Restaurant, 5201 Jefferson Davis Highway, Fredericksburg, VA 22408

RSVP: Kenneth Fowler; **Email**: KD4IIW@yahoo.com

Talk-in: DMR Virginia Statewide, TG 3151 or K4TS Fredericksburg Repeater: 147.015 MHz.

DMR AND AMATEUR RADIO

By Kenneth Fowler (KD4IIW@yahoo.com)

The acronym DMR translates to Digital Mobile Radio. It is a radio transmission standard defined by the European Telecommunications Standards Institute. (ESTI). DMR was created primarily for commercial radio users. DMR is a digital radio mode that can operate on a 6.25 KHz bandwidth. In 2005 a memorandum of understanding was created by radio manufacturers to create this standard. The manufacturers that signed included Tait, Fylde Micro, Selex, Motorola, Hytera, Vertex Standard, Kenwood, and Icom. DMR is commonly referred to as MOTOTRBO in the United States due to the marketing of Motorola Solutions radios to commercial and public safety users.

DMR
DIGITAL MOBILE RADIO ASSOCIATION

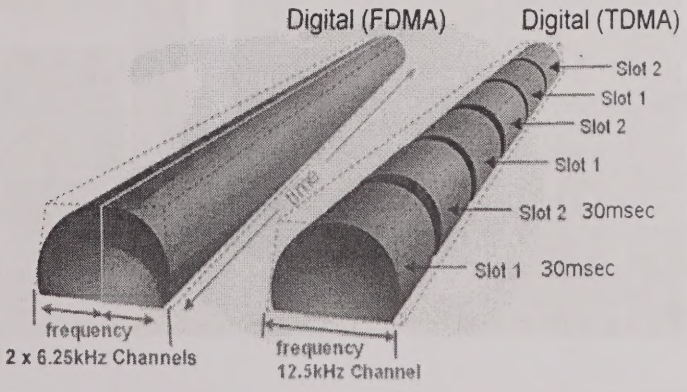
DMR has three tiers created for worldwide usage:

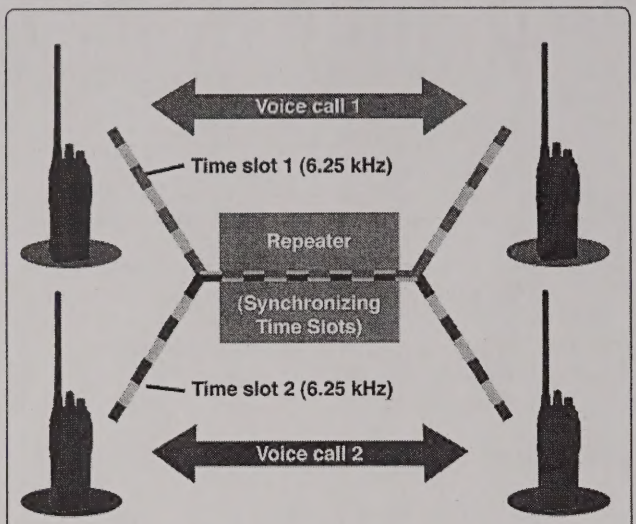
Tier 1 is used primarily in Europe in the 446 MHz (70cm) band. This tier is primarily used in unlicensed operation in the European PMR radio service. It is a single Frequency Division Multiple Access (FDMA) technology with 12.5 KHz bandwidth. It splits the 12.5 KHz into two channels but only one channel can be used at a time. DMR radios that are Tier 1 can cause interference in US Amateur Radio operations in the 70cm band (420-450 MHz). Tier 1 radios generally cannot differentiate between timeslot 1 and timeslot 2. When transmitting only a single conversation can take place on the frequency.

Tier 2 covers licensed conventional systems. Tier 2 systems operate in a two-slot (TDMA) 12.5 KHz bandwidth. Tier 2 is targeted toward those who need to have that spectral efficiency of split-timeslot use, advanced voice features, and integrated IP data services in licensed bands for high-power communications. It accomplishes this by splitting normal narrowband land mobile FM (NFM) 12.5 KHz signals into two time slots. You will find DMR in use within the frequency range of 30 MHz to 1 GHz. Radios designed for Amateur Radio in the US must be Tier 2 compliant. ETSI DMR specifies two-timeslot TDMA in 12.5 KHz channels for Tier 2 and 3. It is in Tier 2 that amateurs are developing their repeater networks.

Tier 3 covers trunking operation. Tier 3 supports voice and short messaging.

DMR is just another of the already crowded list of digital voice modes in use on VHF and UHF amateur radio spectrum. DMR use for Amateur Radio has been explosive recently because of the fairly rapid importation of inexpensive Chinese manufactured radios into the United States, Canada and Europe.





TDMA 1
Using a repeater in digital mode.

Digital Voice Modes used in Amateur Radio Interconnected Systems (per N7MOT)

•D-Star– Digital Smart Technologies for Amateur Radio (FDMA)

•Wires-X/System Fusion - Wide-coverage Internet Repeater Enhancement System (FDMA)

•NXDN (IDAS/NEXEDGE) – Icom/Kenwood Collaboration (FDMA)

•DMR– Digital Mobile Radio (TDMA 2-time slots)

•P25 (Phase 1) – Project 25 or APCO P25 (Phase 1 FDMA, Phase 2 TDMA 2-time slots)

•TETRA- Terrestrial Trunked Radio, formerly known as Trans-European Trunked Radio (TDMA 4-time slots). No known U.S./Canada amateur deployment.

How do I listen?

Here is a current list of scanners that will decode DMR:

Uniden: BCD325P2, BCD436HP, BCD536HP, BCD996P2

Whistler: TRX-1, TRX-2, WS1080, WS1088, WS1095, WS1098

GRE: PSR-800

Radio Shack: Pro-668, Pro-18

To program your scanner you will need to know the correct Color Code of the repeater or simplex user.

Selected Listing of DMR Ham Radio Repeaters - DC,MD,VA

Here is a listing of local amateur radio DMR repeaters:

Freq Out	Offset	Location	cc	Network
145.110	-6khz	Washington	1	K4USD
147.195	+6khz	Thurmont	1	PENN-MAR
442.1125	+5M	F'burg	1	DMR-VA
442.1375	+5M	Ashburn	1	DMR-MARC
442.2125	+5M	Damascus	1	PENN-MAR
442.2375	+5M	Ashton	1	PENN-MAR
442.4125	+5M	Alexandria	1	DMR-VA
442.4375	+5M	Herndon	1	
442.4875	+5M	Rockville	1	K4USD
443.1625	+5M	Linden	1	DMR-VA
443.1875	+5M	Charlotte Hall	6	K4USD
443.7875	+5M	Annapolis	3	
443.8500	+5M	Towson	6	K4USD
444.1625	+5M	Washington	1	DMR-VA
444.6500	+5M	Upper Marlboro		K4USD
448.9750	-5M	Haymarket	6	K4USD

DMR Terminology (per K3NXU)

C-Bridge- IP-based platform used to link multiple repeaters to a given network.

Network– Group of repeaters that share the same talkgroups.

Color Code – This is the DMR equivalent of a CTCSS or DCS code.

Talkgroup– Just like talkgroups on public safety trunking systems. Each one that is assigned has a specific function.

State Groups- This is usually your state and surrounding states. You do not need to be located in the state to use a state group, but it must be available in your repeater's active TG list. It serves as a meeting place for those in your area.

Regional Groups - This is a group of states or a specific region of the country. For example, Mid-Atlantic or South West.

Nationwide, Worldwide and Continental Groups - Sometimes referred to as "calling channels." Please use with courtesy. These TGs link all repeaters nationwide. Although it is not a requirement for use, consider moving to a TAC channel or state TG for long conversations.

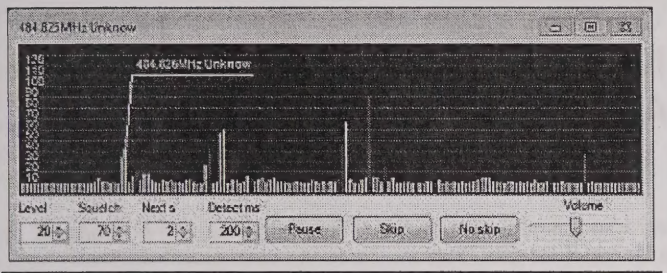
TAC channels- These are the DMR equivalent to "52 simplex." The most common are TGs 310, 311 and 312. You will find several nets and social groups on these channels.

Getting Licensed as an Amateur Radio Operator- Listening or decoding the signal is one thing but transmitting

and becoming part of the conversation is another. Before you can enjoy this exciting digital ham radio mode you will need to get licensed. The Amateur Radio license is issued by the Federal Communications Commission. The license is valid for 10 years before renewal. The only cost of the license is the fee charged by the volunteer license examiners. The Technician Class license is the entry-level license. For more information visit: http://www.arrl.org/getting-licensed.

SCANNING WITH SDR!

By Radio McRadioface



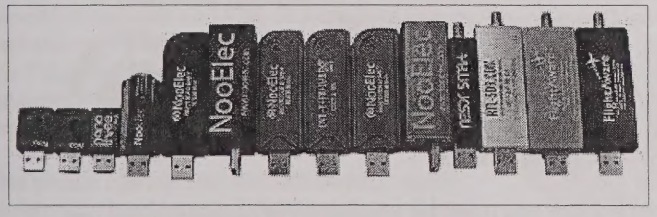
Introduction

So you've reached a point in the hobby where you may like to experiment with new technology, or new techniques to make your listening sessions more efficient.

As a kid I never dreamed my two hobbies, computers and radio, would sync up, but we are currently there and I will give you some basic ideas to get you started on looking into this new paradigm.

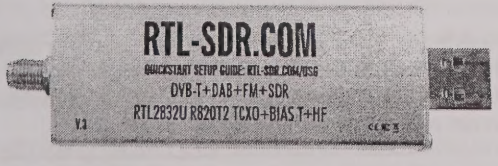
Background info

When I started out in the radio hobby, I had just a single knob and a dial on an 'all-band' radio my mom got me for my birthday. It had the weather bands, police, AM, FM and not much else. 20 years later we have computer-controlled blocks of hardware the size of a pack of cigarettes or even smaller.



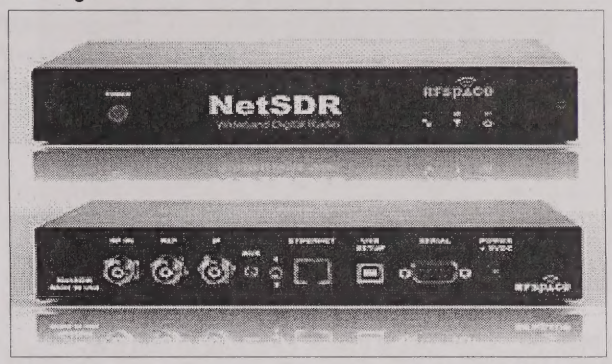
Someone figured out that by modifying a driver for USB sticks that are normally used for TV reception that you could use the RF data for radio, not just TV. The received RF data is digitized and processed by software that runs on-board your PC.

Let's cover some basics! The most approachable SDR has to be the RTL-SDR stick form factor.



I recommend the device from rtl-sdr.com. It has extra goodies that the other units just do not have. Ones with an E4000 chip have coverage from 52 to 2200 MHz! It is a full radio (or three) on a USB stick for $20-$30 from Amazon or eBay!

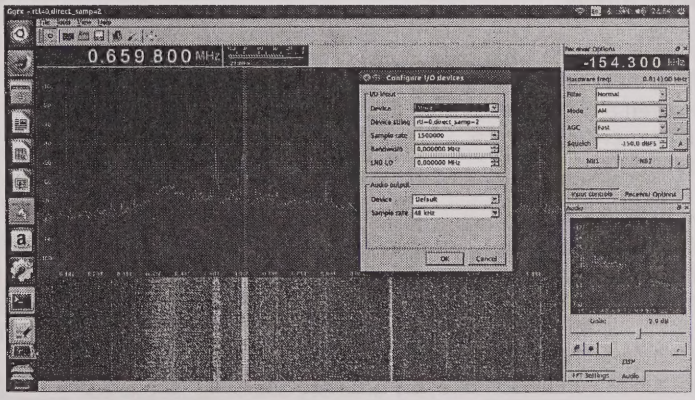
I use these units myself. Much more costly than $20-$30, these are scientific quality instruments and will cost you more than a grand brand new.



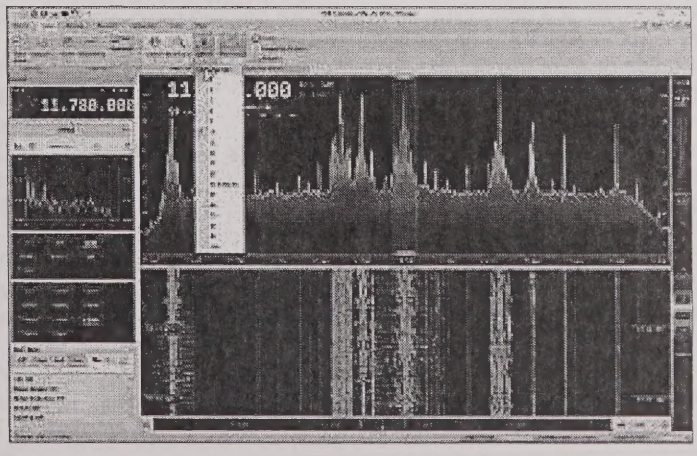
Once you've obtained your unit, you may want to get some adapters to connect to your antenna. So again, Amazon to the rescue! There are tons of adapters available for your antenna.

Now about that software! There's tons of free stuff out there to assist you in scanning your region. Most of the free bundles can work out of the box with your SDR hardware of choice:

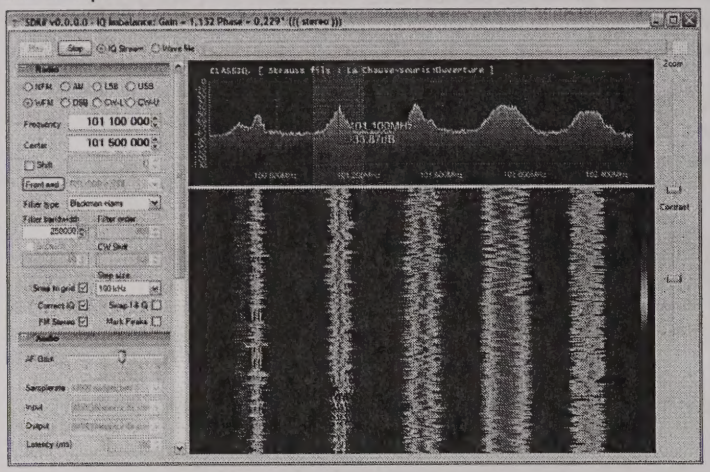
Gqrx:



Sdr-console: (my current choice when using windows):



Sdr-sharp:



Your mileage may vary when using these. Feel free to find me on Twitter (Radio McRadioface) to ask anything you like about these bits of software.

So ok, how do we scan using one of these things now?

Easier said than done. Recently, there have been scanner plug-ins for sdr-sharp in the past, but they go away quickly due to developer quirks and beefs with each other, but if you're really good at hunting around on the Internet, you could find an older version of sdr-sharp and various scanning plug-ins from some fellows in Russia.

Personally, I like to set a wide swath of bandwidth and tune to anything that pops up. That's how I scan. Visually, if you've never seen a histogram of what has transpired around your tuned frequency of choice, you will wonder how you ever lived without it.

I have written many scanning utilities for gqrx which accepts connections via a control port available over your home network, but those utilities are not professional grade and I won't be giving them out anytime soon.

The next generation of SDR will allow us to scroll through an entire portion of bandwidth to replay arbitrary bits of RF captured over time, like a VCR or DVR except you can playback entire portions of the radio spectrum at will. Imagine recording dozens of TV channels at a time. Well, with software defined radio, you can record the entire AM or FM band and play it back at will. One station or all of them! Archive it forever. Burn it to DVD, and post it online!

There is a low barrier to entry, $30 at most, some free software, some wire for an antenna. And entire online communities dedicated to different levels of ability.

If I could find the scanner plug-ins at the time of writing this light introduction, I would have shown how to integrate it all together. Unfortunately, at this time, it wasn't looking to work out like that.

But I guarantee, once you start using software defined radio, you will immediately derive your own benefits and efficiencies from it.

U.S. PARK POLICE NEW RADIO NETWORK MAY BE OPERATIONAL BY JULY 4th!

Testing of the U.S. Park PD's new radio network is expected to resume this month with beta testing for about three weeks toward the end of the month. The new network could be on the air and fully transitioned by July 4th if no additional problems are encountered. Monitor 171.775 (dispatch), 169.7875 (admin) and 169.7 (special events). Encryption is expected eventually.

NEW NCR RADIO ZONE FOR AGENCIES RESPONDING TO WATER RESCUES!

A new radio zone, known as the "Mike Zone," is now operational in the National Capital Region. On the D.C. trunked radio network, "Mike One" is TG 744. It is intended for use by first responders including the Coast Guard, D.C. Harbor Patrol (MPD), the fire boats, police helicopters, etc.

Unlike the discrete channels/talkgroups used by those agencies, this one is not encrypted. Marine Channel 17 (156.85) is still used as well. Keep listening to neighboring trunked systems for the other "Mike Zone" talkgroups and let us know what you find!

MONTGOMERY COUNTY FIRE-RESCUE ON TRACK FOR 2019 CUT-OVER TO P25 NETWORK

Montgomery County Fire & Rescue anticipates transitioning to the county's currently under construction Project 25 trunked network fully in 2019, says Battalion Chief Michael Baltrotsky, Technical Operations Battalion Chief.

The current project, he says, is moving along smoothly, with phase one (integration with the current Type II radio system via Motorola SmartX) happening this fall.

At this time there has been no discussion about encrypting routine FRS talkgroups, he said. Furthermore, Chief Baltrotsky says that two-tone pagers will continue to be used. "Fact is, QCII is a very solid technology, and is reliable even in cases of disaster because it is not reliant on commercial networks," he points out.

"We are looking at the offerings that Unication and others provide, however, I see no changes in the foreseeable future to that technology," he adds.

With a P25 radio system, the possible subscriber platform opens up widely to other manufacturers, Chief Baltrotsky points out. "The MCFRS is always evaluating our options and will consider all of them when we replace subscribers."

OCEAN CITY, WORCESTER COUNTY MIGRATING TO P25 TRUNKING NETWORKS

Headed to the beach this summer? There will be new Harris Project 25 radio systems in place for both Ocean City and Worcester County.

Worcester County transitioned to P25 from a legacy EDACS system on February 14, 2018. For the near future, both the EDACS and P25 systems will co-exist for both Ocean City and Worcester County with some talkgroups patched to each other via a Harris migration gateway. OC's P25 system is nearing the finish line but an exact go-live date has yet to be determined.

Both systems are planned to carry P25 Phase 2 traffic but will be able to handle Phase 1 for older legacy radios not capable of being upgraded. Public safety users will operate on Phase 2 while agencies such as public works will remain on Phase 1.

Phase 2 (which is TDMA) is more efficient as it allows for two voice paths per frequency with the exception of the control channel which requires the entire frequency.

Paging/alerting will remain on VHF for fire and EMS. 155.1 MHz for Worcester County and 158.895 MHz for Ocean City.

In Worcester County, the same EDACS channels were converted to operate on P25. During the transition, some EDACS repeaters were turned off and replaced with P25. Ocean City was able to obtain new 700 MHz frequencies in hopes of alleviating years of interference by other agencies using the same frequencies from up and down the coast.

Worcester County went from a three-site EDACS to a six-site P25 network. Existing sites at Berlin MSP Barracks, Central Landfill in Newark and Klej Grange Road in Stockton were reused. New sites were built at the Pocomoke City industrial park, at the Nassawango Fire Tower on MD Route 12 and in West Ocean City at Mystic Harbor.

The Mystic Harbor site ran into several roadblocks with the Maryland Aviation Administration and elevation concerns of antenna in the path of a runway at Ocean City Municipal Airport at the forefront. An unexpected additional expense to build a standalone 140-foot freestanding site on the same property slightly to the east was the solution. The Mystic Harbor site has been constructed but may be a few more months before it comes online as site utilities and the installation of a microwave path back to the central site are still outstanding.

Ocean City has built two systems, a three-site simulcast system on the island and a standalone multicast backup site nearby on the mainland in Ocean Pines. OC sites are at 1st Street, 65th Street and 140th Street with a backup at Routes 589 and 90.

While technically Ocean City and Worcester County are separate systems, just as they are currently in EDACS, radio traffic will be shared between them seamlessly as mutual aid and joint operations will continue with both jurisdictions daily. A new feature now capable with P25 will be the ability to roam between the two systems automatically depending on signal strength to the nearest tower. Previously users would have to manually switch between Ocean City and Worcester County when transiting the respective coverage areas.

While the majority of traffic planned on both systems will be in the clear, you can expect more encryption to be present. The encrypted Worcester County fire talkgroups will be the Fire Marshal's Office and WO FIRE 11 which will be used to relay entry codes or key locations, other private information, etc.

The Worcester County Sheriff's Office and other LEOs will have a primary talkgroup that is in the clear along with one or two encrypted talkgroups per department. It is unknown what Ocean City's encryption scheme will look like but we imagine the majority will be able to be heard.

While OC and Worcester are using Harris, neighboring jurisdictions have different plans. Wicomico and Sussex County, Delaware are Motorola and Somerset is staying on EDACS for now. Wicomico is in final acceptance and programming and is expected to transition to P25 before Memorial Day. Somerset is considering all options including going on MD FiRST or joining the Harris P25 upgrade path. All LEO talkgroups are currently EDACS ProVoice in Somerset County.

Both Ocean City and Worcester County looked at going on MD FiRST when they were shopping for an upgrade. Both determined it was not feasible both fiscally and operationally because it was significantly more expensive, and the jurisdictions would lose complete control when they purchased and installed new sites and then turned them over to the state to maintain.

One thing is for sure, if you are heading to the beach this summer make sure you invest in a Phase 2 scanner to moinitor all the behind-the-scene operations at Maryland's summertime playground.

Ocean City P25 System
System ID: 19A
WACN: 92F70

Ocean City Simulcast:
Site: 30 769.26875770.05625770.85625772.10625
772.43125772.70625

Ocean Pines Multicast:
Site: 05 856.5375 857.7375 858.2875 858.7375
859.6125

Worcester County P25 System
System ID: 06E
WACN: 92F70

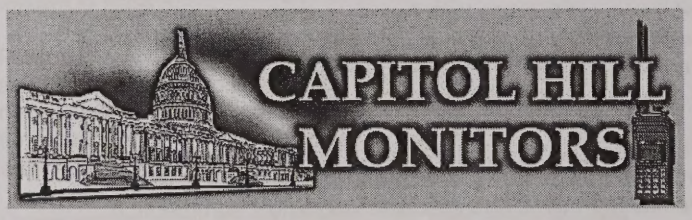
Site: 10 855.9625 856.4625 857.4625 857.7125
858.4625 858.7125 859.4625 859.7125

MANY THANKS TO THE WRITERS/CONTRIBUTORS IN THIS ISSUE. PLEASE KEEP CHM IN MIND FOR FUTURE ARTICLE, MEETING AND TOUR SUGGESTIONS.

The Capitol Hill Monitor
c/o Alan Henney
6912 Prince George's Avenue
Takoma Park, MD 20912-5414

Inside this issue:

CHM "SOUTH" GET-TOGETHER SCHEDULED THIS WED, MAY 9, 2018, IN FREDERICKSBURG!
Also DMR and Amateur Radio, SDR scanning, O.C./Worcester go P25, updates on US Park PD, Mont Co and the new NCR marine zone!



Please address all correspondence to Alan. We encourage readers to submit material and write articles that relate to the hobby. All submissions are subject to editing for style and content. When submitting material please make certain we can contact you should we have any questions. We welcome frequency and visitor requests, but please include a reply envelope.

Contact: Alan Henney (alan@henney.com)
6912 Prince George's Avenue
Takoma Park, MD 20912-5414
301-270-2531 (voice) / 425-699-7195 (fax)

CHM Staff:
Dr. Willard Hardman, Executive Editor
Mike Peyton, Technical Advisor
Mike Agner, Links Editor
Ken Fowler, Northern Virginia Correspondent
Alan Henney, Editor & Treasurer

The *Capitol Hill Monitor* is the non-profit newsletter of the Capitol Hill Monitors. The newsletter keeps scanner enthusiasts abreast of local meetings, frequency profiles and other topics of interest. Dues are $10 and include 12 issues (back issues cost $1 each). Kindly make checks payable to Alan Henney. Membership will be prorated accordingly in the event of a postage increase.

Meet Local Scanner Enthusiasts Online!
Subscribe to the Scan-DC e-mail list by visiting:
http://mailman.qth.net/mailman/listinfo/scan-dc

Visit CHM's Scanner Links Page:
http://henney.com/chm/

Join the NCR Public Safety Zello Notification Channel:
http://zello.com/scandc

CHM HAS GONE PAPERLESS!

The *Capitol Hill Monitor* newsletter is converting to electronic distribution. "Snail mail" distribution will continue for the time being at the current cost of $10 for 12 issues (**please do not send more than $10**!). Since the newsletter is provided at cost, the online version is available for free. To receive the online version, please send an e-mail to alan@henney.com. When the next issue is available, you will receive an e-mail with a link and list of topics for that issue. We welcome your input, suggestions and article submissions.